Space Weather Forecast

Issued on Sunday, 22 January 2023 at 01:10 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: R1/R2 Radio Blackouts considered likely throughout. Chance of G1/Minor Geomagnetic Storms days 2 and 3 (23rd and 24th).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low through the past 24 hours, with only common-class flares. There are currently nine sunspot regions on the visible disc, with the two large and magnetically complex regions capable of producing significant flares. No Earth-directed CMEs have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar wind speeds have been elevated to slightly elevated, with a peak of 550km/s at 21/0908 UTC, before a gradual decline to near 450km/s. The Interplanetary Magnetic Field was generally steady at moderate levels initially, before becoming erratic and fluctuating between weak and moderate levels during the 21st. The north-south component was weak and mostly positive initially before becoming erratic with a more prolonged spell of negative Bz at mostly moderate levels between 21/0300-0600 UTC. Geomagnetic activity was Quiet to Unsettled (Kp 0-3), with an Active (Kp 4) interval between 21/0300-0600 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Low to Moderate, with a slight chance of reaching High levels, with two large and complex sunspot regions on the visible disc, which are capable of producing significant flares.

Solar Wind / Geomagnetic Activity: The high speed stream from coronal hole 68 will likely continue to effect Earth during day 1 (22nd), though easing over time. Two coronal mass ejections (CMEs) may effect Earth during days 2 and 3 (23rd and 24th), though both are low confidence. Coronal hole 69 is likely to connect with Earth during day 3 (24th), with speeds of around 550 km/s expected, these effects probably lasting into day 4 (25th), before gradually easing.

Generally Quiet to Active geomagnetic activity is expected during day 1 (22nd) due to gradual waning effects of a fast wind from coronal hole 68. A chance of G1/Minor storms on days 2 and 3 (23rd and 24th) due to the potential CME arrivals and then the fast wind of coronal hole 69 respectively. Geomagnetic activity gradually waning on day 4 (25th).

Energetic Particles / Solar Radiation: Solar radiation will most likely remain at background levels, but with a slight chance of enhancements to S1 or greater through the period, in association with any larger flares.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	30	30	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	70	70	70	70
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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